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U. S. DEPARTMENT of AGRICULTURE ★ SOIL CONSERVATION SERVICE
WATER SUPPLY OUTLOOK
FOR
MONTANA

and
FEDERAL-STATE-PRIVATE COOPERATIVE SNOW SURVEYS
Collaborating with
MONTANA AGRICULTURAL EXPERIMENT STATION

AS OF
MAR. 1, 1978



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The mountain snowpack is accumulating at average or above average amounts, assuring Montana a good water supply this season. This season's snowpack is generally 2 to 3 times greater than last year's.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
P.O. Box 98
BOZEMAN, MONTANA 59715
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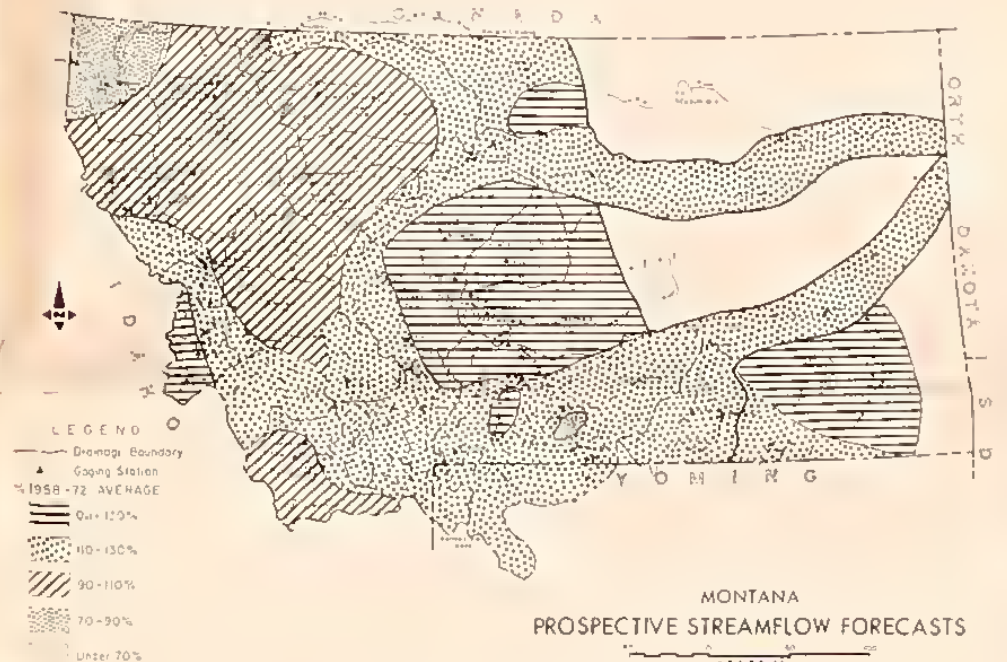
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Montana Water Supply Outlook

MOUNTAIN SNOWPACK

THE SNOWPACK IS GENERALLY NEAR OR ABOVE AVERAGE. SOUTH-WESTERN DRAINAGES SHOWED CONSIDERABLE IMPROVEMENT DURING FEBRUARY. TWO AREAS SHOW BELOW AVERAGE SNOWPACK: ONE NEAR LIBBY AND THE OTHER NEAR RED LODGE. COOPERATORS REPORT AN

ABNORMALLY HEAVY SNOWPACK IN MOST EASTERN PRAIRIE AREAS. HEAVY MOUNTAIN SNOWPACKS ARE FOUND IN THE UPPER REACHES OF THE BITTERROOT, BIGHOLE, MADISON AND YELLOWSTONE RIVER DRAINAGES.



STREAMFLOW FORECASTS

APRIL THROUGH SEPTEMBER STREAMFLOW IS FORECAST TO BE AVERAGE OR ABOVE FOR MOST STREAM SYSTEMS. THE KOOTENAI RIVER AND RED LODGE CREEK ARE PREDICTED TO HAVE BELOW AVERAGE RUNOFF. NEAR AVERAGE RUNOFF IS EXPECTED FROM THE CLARK FORK, BLACKFOOT AND FLATHEAD RIVERS WEST OF THE DIVIDE; BEAVERHEAD, DEARBORN, SUN, TETON, AND

MARIAS RIVERS EAST OF THE DIVIDE; AND THE ST. MARY'S RIVER THAT FLOWS INTO HUDSON BAY.

WELL ABOVE AVERAGE FLOWS ARE FORECAST FOR THE BITTERROOT AND STREAMS DRAINING SMALL MOUNTAIN RANGES IN CENTRAL MONTANA.

IRRIGATION WATER SUPPLIES ARE EXPECTED TO BE AVERAGE OR ABOVE IN MOST AREAS.

PLEASE NOTE

The Water Supply Outlook for Montana will be issued on this format. We hope it will serve your needs. Our reasons for going to a newspaper-style format are reduced cost, faster printing and reduced preparation and mailing time.

The Statewide Water Supply Outlook and the 13 watershed reports have been combined into one report. Each fall an October 1 report will be issued using the old book-style format. The October 1 report will include all snow course measurements for the previous snow season, and other pertinent snow pillow, soil moisture and precipitation readings. The fall report will also include a map showing snow course locations and elevations. Maps showing snow course locations will not be included in any of the monthly newspaper-style reports. For this year only, a statewide map of snow course locations can be requested by writing to: Snow Survey Supervisor, Soil Conservation Service, P. O. Box 98, Bozeman, Montana 59715.

The mailing list for this Water Supply Outlook has been obtained by combining the mailing lists from the State Water Supply Outlook and the 13 watershed reports. All recipients will receive the Water Supply Outlook issued January 1, February 1, March 1, April 1, May 1, May 15, and June 1 of each year.

If you do not wish to receive future reports please let us know and we will remove your name from our mailing list. Purge cards will be mailed this spring. Those who do not return these cards will be dropped from the mailing list.

Columbia River Drainage

CANADA

STREAMFLOW FORECASTS

KOOTENAI - GENERALLY 10 TO 15 PERCENT BELOW AVERAGE, FLATHEAD - NEAR AVERAGE RUNOFF ON ALL TRIBUTARIES, BLACKFOOT - NEAR AVERAGE RUNOFF FOR MOST TRIBUTARIES, UPPER CLARK FORK - A LITTLE BELOW AVERAGE IN THE EXTREME HEADWATERS NEAR ANACONDA AND SOUTH OF BUTTE, AVERAGE OR

ABOVE FOR OTHER TRIBUTARIES, BITTERROOT - WELL ABOVE AVERAGE FROM WEST-SIDE AND HEADWATERS, ABOVE AVERAGE FROM MOST EAST-SIDE STREAMS, LOWER CLARK FORK - NEAR AVERAGE RUNOFF FROM LOCAL STREAMS AND SLIGHTLY ABOVE AVERAGE FLOW IN THE CLARK FORK RIVER.

DAVEY FORECAST POINT	THIS YEAR			PAST RECORD	
	FORECAST		FORECAST PERIOD	PREVIOUS RECORD	
	Forecast (Acres)	Percent of Average		Forecast	Average
KOOTENAI RIVER below Libby Dam (1)	6,600	89	Apr-Sept	3,976	7,456
	5,650	88	Apr-July	3,043	6,417
	4,400	88	Apr-June	2,469	5,011
FISHER RIVER near Libby	258	90	Apr-Sept		286
	245	91	Apr-July		269
YAK RIVER near Troy	475	84	Apr-Sept		568
	450	83	Apr-July		544
KOOTENAI RIVER at Leona (1)	8,150	90	Apr-Sept	4,910	9,073
	7,170	90	Apr-July	3,844	7,957
	5,800	90	Apr-June	3,050	6,431
INFLUX MOULTON RESERVOIR near	240	109	Apr-June	103	220

BLACKFOOT RIVER near Bonner	1,070	104	Apr-Sept	1,031	
CLARK FORK RIVER above Milltown (7)	970	104	Apr-July	934	
CLARK FORK RIVER above Missoula	840	103	Apr-July	814	
WEST FORK BITTERROOT RIVER near Conner (7)	870	110	Apr-Sept	792	
BITTERROOT RIVER near Darby	770	111	Apr-June	690	
SKALKAHO CREEK near Hamilton	660	112	Apr-June	590	
BURNED FORK CREEK near Stevensville (8)	1,940	106	Apr-Sept	573	1,823
BITTERROOT RIVER at Missoula (9)	1,740	107	Apr-July	473	1,624
CLARK FORK RIVER at St. Regis (NWS)	1,500	107	Apr-June	408	1,404

NORTH FORK FLATHEAD RIVER near Columbia Falls	235	137	Apr-Sept	172	
SOUTH FORK FLATHEAD RIVER near Columbia Falls	220	141	Apr-July	156	
FLATHEAD RIVER at Columbia Falls (10)	800	137	Apr-Sept	242	
SWAN RIVER near Big Fork	1,750	138	Apr-July	204	542
FLATHEAD RIVER near Polson (11)	660	138	Apr-June	176	479
CLARK FORK RIVER near Plains (11) (NWS)	65.0	115	Apr-Sept	56.6	
THOMPSON RIVER near Thompson Falls	58.5	118	Apr-July	49.6	
PROSPECT CREEK at Thompson Falls	42.7	121	Apr-Sept	35.3	
CLARK FORK RIVER at Whitehorse Rapids (12) (NWS)	37.5	121	Apr-July	31.0	

Adjusted for storage in Lake Kootenai.	(1)				
Adjusted for storage in Silver Lake, diversions to and pumping from Georgetown Lake.	(2)				
Adjusted for storage in Georgetown Lake, diversions from and pumping to Silver Lake.	(3)				
Sum of Flint Creek at Maxville and Boulder Creek at Maxville.	(4)				
Sum of North Fork Lower Willow Creek near Hall and South Fork Lower Willow Creek near Hall.	(5)				
Difference in observed flow Clark Fork above Missoula and Blackfoot near Bonner.	(6)				
Adjusted for storage in Painted Rocks Reservoir.	(7)				
Adjusted for diversion into Sunset Highline Canal.	(8)				
Difference in observed flow Clark Fork above and below Missoula.	(9)				
Adjusted for storage in Hungry Horse Reservoir.	(10)				
Adjusted for storage in Hungry Horse Reservoir and Flathead Lake.	(11)				
Adjusted for storage in Hungry Horse Reservoir, Flathead Lake and Noxon Rapids Reservoir.	(12)				

Forecast made by National Weather Service.	(NWS)				
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Average based on 1958-77 period.



COLUMBIA RIVER DRAINAGE MOUNTAIN SNOW WATER EQUIVALENT

SUMMARY OF SNOW MEASUREMENTS (COMPARISON WITH PREVIOUS YEARS)

RIVER BASIN AND SUB-BASIN	Number of Gauging Stations	1958-77 Average	1978-79 Average
Kootenai/BC	24	199	90
Kootenai/Mont	17	289	93
Kootenai	41	241	92
Little Bitterroot	4	392	115
Flathead	31	224	104
Clark Fork ab.			
Blackfoot	21	286	110
Blackfoot	15	256	106
Clark Fork ab.			
Missoula	36	271	108
Bitterroot	10	320	120
Lower Clark Fork			
bl. Missoula	14	292	99
Cl. s.			
w/o Flathead	60	289	107
Pend O'Reille			
(Clark Fork and Flathead)	91	260	106
Columbia (Pend O'Reille & Koot)	122	249	100

MOUNTAIN SNOWPACK

KOOTENAI - GENERALLY AVERAGE TO SLIGHTLY BELOW AVERAGE OVER MOST OF THE MONTANA PORTION, AND SLIGHTLY BELOW IN BRITISH COLUMBIA, FLATHEAD - GENERALLY NEAR AVERAGE, BUT A LITTLE ABOVE IN THE SOUTHERN PORTION AND WEST OF KALISPELL, BLACKFOOT - ABOVE AVERAGE OVER NORTHWESTERN TWO-THIRDS OF DRAINAGE TO AVERAGE OR BELOW IN SOUTHWESTERN,

UPPER CLARK FORK - GENERALLY NEAR AVERAGE, BUT VARIABLE BETWEEN VARIOUS MOUNTAIN RANGES, ABOVE AVERAGE ALONG THE BITTERROOT AND BIGHOLE DIVIDE, BITTERROOT - ABOVE AVERAGE ALONG THE NORTHERN PART INCREASING TO WELL ABOVE AVERAGE IN THE SOUTHERN DRAINAGES, LOWER CLARK FORK - NEAR AVERAGE.

WATER SUPPLY OUTLOOK

SINCE 1900 AREA	Spring Season	Summer Season
Tobacco River	Av	Av
Little Bitterroot	Av	Av
Missoula Valley	Av	Av
Flint Creek	Av	Av
Upper Clark Fork	Av	Av
Nevada Creek	Av	Av
Blackfoot	Av	Av
West-side Bitterroot	Ex	Ex
East-side Bitterroot	Av	Av
Bitterroot River	Ex	Ex
Lower Clark Fork	Av	Av

IRRIGATION WATER SUPPLIES

ALL STREAMS SHOULD HAVE ADEQUATE EARLY SEASON SUPPLIES, LATE SEASON SUPPLIES ABOUT AVERAGE,

EXCEPT FOR ABOVE AVERAGE ON THE BITTERROOT RIVER,

SOIL MOISTURE

SOILS UNDER THE SNOWPACK HAVE ABOUT AVERAGE MOISTURE LEVELS SOUTH OF A LINE FROM THE BLACKFOOT-FLATHEAD-SUN RIVER DIVIDE TO THE POINT WHERE THE IDAHO-MONTANA-BRITISH COLUMBIA BORDERS MEET, THE AREA NORTH

OF THIS LINE GENERALLY HAS BELOW AVERAGE MOISTURE LEVELS, SOIL MOISTURE IS BASED ON MOISTURE LEVELS AT SOIL MOISTURE STATIONS, FALL PRECIPITATION AND STREAMFLOW LEVELS DURING THE EARLY WINTER PERIOD,

SNOW

DRAINAGE BASIN and/or SNOW COURSE		THIS YEAR		PAST RECORD		
NAME	Elevation	Date of Survey	Snow Depth (Inches)	Water Content (Percent)	Water Content (Percent)	
				Last Year	Previous	
AMHROSE	6460	2/27	40	12.8	4.7	11.6
AMH FALLS	7350	2/27	43	11.9	5.2	10.4
BARBER PASS	6900	2/25	63	34.3	17.6	37.4
BALD EAGLE PEAK	5700	2/23	127	48.3	19.0	60.4
BALD MOUNTAIN (WY)	9400	2/25	84	26.3	19.8	19.4
BALD RIDGE	7500	2/25	48	14.2	9.0	11.3
BARKFIELD MOUNTAIN	3600	2/24	50	19.7	5.2	23.2
BARKFIELD MOUNTAIN PILLON	5600	3/61	SP	16.1	5.8	19.4
BARKER CREEK	5500	2/28	103	38.8	19.5	43.6
BARKER MOUNTAIN	4600	2/28	90	31.9	16.5	24.6
BARKER TRAIL	3800	2/28	35	11.0	1.0	10.8
BARKER CREEK	7180	2/27	30	5.8	2.0	-
BATTLE RIDGE	5150	3/01	41	12.4	1.9	10.4
BEAR BASIN	6020	2/28	39	12.8	4.4	7.0
BEAR MOUNTAIN (10)	8150	3/01	75	26.1	11.7	15.4
BEAR PAW SKI AREA	5400	2/22	119	49.1	-	59.1
BEAVER LAKE	5200	2/23	39	11.2	6.6	6.4
BERRY MEADOW	5900	2/25	61	22.4	9.0	21.4
BIG COULEE	7000	2/24	35	8.3	2.1	7.5
BIG CREEK	5100	2/22	36	9.9	6.4	-
BIG SKY	6750	2/23	127	48.5	20.3	41.7
BIG SKY MEADOW	7700	2/28	61	17.7	3.5	13.4
BIG SNOWY	6350	3/01	42	9.8	4.7	0.8
BIG SPRINGS (11)	7150	2/24	78	27.8	15.0	15.0
BLACK BEAR	6500	2/27	70	23.5	6.0	10.6
BLACK BEAR PILLON	7950	2/24	112	42.1	9.8	-
BLACK PINE	7500	2/24	SP	17.4	10.7	-
BLACK PINE PILLON	7100	3/01	48	14.7	4.0	11.6
BLOODY DICK	7100	3/01	SP	14.6	5.4	11.7
BLOODY DICK PILLON	7600	3/01	49	15.3	13.5	12.1
BLUE LAKE	5900	3/01	SP	13.1	4.2	-
BUNTS SOTS	6000	2/25	57	20.8	11.5	26.4
BOULDER MOUNTAIN	6000	2/25	28	5.2	3.5	-
BOX RIVER #1 (AL)	7950	2/21	65	22.1	7.4	16.3
BOX CANYON	5100	2/28	30	7.6	4.4	8.1
BRANHAM LAKES	6670	2/27	45	13.2	5.5	-
BROOKER BOWL	8850	2/27	86	30.2	10.4	25.8
BROOKER BOWL PILLON	7250	2/28	67	31.2	13.1	26.1
BROOKER CREEK	3900	2/24	SP	28.9	14.6	24.3
BROOKER CREEK TIMBER	5000	2/28	33	11.2	2.0	13.7
BULL MOUNTAIN	6600	2/27	34	11.0	3.4	10.2
BURGESS R.S. #2 (WY)	7900	2/27	30	5.0	2.0	-
CABIN CREEK	5200	2/26	36	8.3	8.4	7.3
CALVERT CREEK	6450	3/02	49	14.0	3.2	9.1
CALVERT CREEK PILLON	6450	3/02	SP	12.6	3.4	-
CAMP CREEK (10)	6800	2/28	37	9.3	1.5	9.0
CAMP MISERY	6900	2/24	118	48.4	30.2	42.2
CAMP SENIA	7800	2/25	24	4.0	1.6	5.2
CANYON (WY)	7750	3/01	61	19.1	5.7	13.9
CANYON BASIN	9000	2/26	96	25.0	9.2	32.3
CANYON BASIN PILLON	9000	2/28	SP	27.9	6.9	23.9
CARTER CREEK	7400	3/01	12	2.6	4.4	-
CECIDER GROVE	4100	2/23	38	13.0	3.1	11.6
CHATEAU LAWN #8 (AL)	5700	2/24	33	8.0	-	9.2
CHESSMAN RESERVOIR	6200	2/25	22	5.5	1.4	3.1
CHICKEN CREEK	4060	2/22	46	15.6	8.4	-
CHICKEN CREEK	7850	2/28	41	10.0	8.4	-
CHICKEN CREEK PILLON	7850	2/28	SP	9.6	8.2	-
CHICKEN CREEK	6300	2/24	38	10.1	6.1	-
COMBINATION	5600	3/01	28	5.9	2.0	6.7
COMBINATION PILLON	5600	3/01	SP	5.9	3.5	-
COKE STATION	6150	2/28	84	27.0	8.8	17.6
COPPER BOTTOM	5200	3/02	42	7.3	3.0	11.1
COPPER BOTTOM PILLON	5200	3/02	SP	12.2	4.4	-
COPPER CAMP	6950	3/02	63	26.4	9.6	36.3
COPPER CREEK	5700	3/02	50	10.4	4.7	15.4
COPPER LAKE CREEK	6100	3/02	74	21.2	7.4	22.6
COPPER MOUNTAIN	7700	2/24	44	11.7	4.0	10.0
COYOTE HILL	4200	3/01	40	12.7	6.7	16.4
CREVIER MOUNTAIN	8400	2/27	56	13.3	6.8	4.2
CRYSTAL LAKE	6100	2/24	57	17.4	12.0	12.3
DAISY PEAK	7600	2/24	48	12.4	5.5	10.3
DAILY CREEK	5780	2/24	36	11.2	4.6	-
DAVIS CREEK	5400	2/21	60	22.5	4.7	23.0
DEADMAN CREEK	6450	2/24	48	15.6	9.0	11.4
DEADMAN CREEK PILLON	6450	2/24	SP	13.7	8.6	9.8
DESERT MOUNTAIN	5600	3/01	44	15.0	7.0	14.7
DEVILS SLIDE	8100	2/27	66	21.3	12.8	26.2
DISCOVERY BASIN	7050	2/26	35	4.4	5.1	-
DIX HILL	6400	2/26	37	12.0	4.4	-
EL DORADO MINE	7800	2/24	60	19.5	7.4	18.1
ELK PEAK	8000	2/27	60	21.2	10.8	15.0
EMERY CREEK	4350	2/24	44	19.4	7.6	-
EMERY CREEK PILLON	4350	2/21	SP	14.2	7.2	-
FATTY CREEK	5000	2/28	89	27.9	12.4	21.0
FISH CREEK	8000	2/27	35	7.0	2.4	-
FISHER CREEK	9100	2/28	121	41.7	17.2	32.6
FISHER CREEK PILLON	9100	2/28	SP	37.1	17.2	30.5
FIVE SPRINGS FALLS (WY)	7500	2/26	42	10.5	8.3	7.4
FIVE-BULL	5700	2/25	31	7.7	2.2	7.0
FLEECER RIDGE	7500	2/28	40	13.9	3.7	-
FLOOR HILL	6900	2/27	34	8.2	2.0	7.6
FORTH OF JULY	3450	2/24	34	10.6	2.3	-
FRED BURG PASS	8000	2/28	75	25.6	9.9	23.5
FRIED CREEK	6000	2/25	50	16.7	6.2	14.0
FRIED HILL	4420	2/24	55	19.5	5.8	-
FROHNER MEADOWS	6480	2/27	37	9.0	3.2	-
FROHNER MEADOWS PILLON	6480	2/27	SP	9.1	3.9	-
GARVER CREEK	4250	2/21	34	12.6	2.1	12.3
GARVER CREEK PILLON	4250	3/01	SP	10.9	4.7	10.7
GIBBONS PASS	7100	2/23	70	25.1	5.5	20.3
GIBBONS PASS	7000	2/27	46	13.6	4.0	10.1
GOLD CREEK LAKE	7200	2/24	44	13.0	4.0	13.0
GOLD STONE	4100	3/01	58	18.4	5.0	25.3
GRASSHOPPER	7100	2/27	30	8.2	4.2	5.1
GRASS CREEK	4380	2/27	58	19.1	6.6	17.9
GRASS CREEK PILLON	4380	2/27	SP	17.9	7.4	-
GROFFIN CREEK DIVIDE	5150	2/26	42	13.2	3.7	11.6
GRIZZLY PEAK	8400	2/28	41	10.1	8.2	13.6
GUNSHIRT LAKE	6300	2/27	95	38.6	19.3	39.1
HARVISON CREEK (10)	4850	2/22	104	34.4	-	44.3
HARD CREEK	5030	2/27	39	13.2	5.8	-
HARD CREEK PILLON	5030	2/27	SP	13.9	6.1	-
HARVINS LAKE	6450	2/21	69	27.8	6.0	26.3
HARVINS LAKE PILLON	6450	3/01	SP	13.6	9.2	26.4
HART LAKE TRAIL	4600	3/03	62	19.8	6.7	21.2
HEDEN DAM	6550	3/01	54	18.4	5.9	10.6
HILL ROARING DIVIDE	5770	3/01	73	27.4	15.5	29.1
HURRIE JUNCTION	4850	2/26	67	22.8	11.4	-
HURWOOD DIVIDE	5650	2/27	44	13.0	8.4	-
HURWOOD STATION	4600	2/27	29	7.4	6.7	-

SNOW	THIS YEAR				PAST RECORD		
	DRAINAGE BASIN and SNOW COURSE		Drain. (Sq. Miles)	Snow Depth (Inches)	Water Content (Inches)	Water Content (Inches)	
	NAME	Elevation			Last Year	Average	
	TIMBERLINE CREEK	8850	2/25	40	8.6	7.0	12.4
	THIRKUS LAKE	6100	2/25	106	42.5	29.0	39.9
	TV MOUNTAIN	6000	2/21	63	19.4	5.5	17.0
	THIRLVILLE CREEK	5600	2/22	63	24.2	9.0	18.0
	THIRLVILLE CREEK PILLW	5600	2/22	SP	19.2	8.2	16.4
	THIRTY-ONE MILE	7150	3/01	63	22.2	5.0	16.1
	TWIN LAKES	3580	2/27	40	13.0	6.4	12.3
	TWIN LAKES	6510	2/22	113	44.8	16.4	37.2
	TWIN LAKES PILLW	6400	2/22	SP	42.2	15.4	37.7
	UPPER HOLLING LAKE	6200	2/25	92	37.5	21.2	35.7
	VALLEY VIEW (ID)	6500	2/27	52	17.2	4.9	15.4
	WALDORF	5600	3/01	43	13.7	3.4	11.2
	WALDORF PILLW	5600	3/01	SP	9.6	4.6	11.9
	WASEL DIVIDE	5450	2/27	83	31.7	10.0	32.6
	WEST ROBERT	7500	2/14	26	7.4	-	6.5
	WEST YELLOWSTONE	6700	3/01	47	15.1	3.2	10.6
	WEST YELLOWSTONE PILLW	6700	2/26	SP	9.4	2.2	7.7
	WHISKEY CREEK	6800	2/24	68	23.8	5.7	18.5
	WHISKEY CREEK PILLW	6800	2/21	90	11.6	6.1	-
	WHITE LELPHANT (ID)	8700	2/28	104	32.3	10.4	24.1
	WHITE MOUNTAIN	6700	2/28	SP	28.7	11.4	-
	WHITE MOUNTAIN PILLW	6800	2/26	35	7.7	4.2	-
	WILLOW CREEK	7650	3/01	54	16.2	4.0	-
	WOLVINE (ID)	5700	2/24	47	16.2	4.5	14.6
	WONG CREEK	6800	2/25	54	20.2	6.8	19.2
	WONG RIDGE						

LATE ARRIVING DATA

Abundance Lake	8800	3/02	70	22.4	-	17.7
Beagle Springs	8850	3/05	34	8.8	1.7	-
Black Mountain	7750	3/06	56	15.5	5.0	-
Call Road	8050	2/28	50	12.6	4.8	9.8
Clover Meadow	8600	2/28	63	17.6	6.6	14.7
Dad Creek Lake	8400	3/03	41	11.4	3.0	11.9
Darkhorse Lake	8600	3/02	85	31.1	10.0	24.2
Divide	7800	2/28	39	11.4	3.2	10.0
Divide Pillw	7800	2/28	SP	10.9	4.2	-
East Fork R. S.	5400	3/03	25	7.2	3.6	6.7
Elk Horn Springs	7800	3/02	46	13.3	3.3	8.4
Foolhen	8280	3/02	57	17.7	6.4	15.6
Lemhi Pass	7480	3/03	39	10.8	2.5	7.9
Lemhi Ridge	8100	3/03	46	13.8	2.9	8.9
Lemhi Ridge Pillw	8100	3/03	SP	12.2	4.1	-
Nez Perce Camp	5580	3/03	55	17.3	6.3	13.0
Nez Perce Camp Pillw	5580	3/03	SP	17.8	6.4	-
Nez Perce Pass	6570	3/03	57	19.7	7.0	14.3
Northeast Entrance Pillw	7400	3/02	SP	13.0	5.0	8.3
North Fork Elk Creek Pillw	6250	2/27	SP	13.7	5.5	10.9
Notch	8500	2/28	55	15.7	5.8	13.3
Pickfoot Creek	6650	2/21	41	12.3	3.6	-
Skalkaho Summit	7260	3/03	75	28.4	8.4	23.4
Skalkaho Summit Pillw	7260	3/03	SP	26.3	8.7	-
Slag-A-Melt Lake	8750	3/02	79	28.8	7.1	24.8
Trail Creek	7090	3/03	39	10.2	2.1	7.1
Warm Springs	7800	3/03	64	21.0	-	-
White Pine Ridge	8850	3/05	20	4.0	1.4	4.7

Average based on 1958-72 period. A - Aerial observation; water content estimated. SP - Snow Pillw observation; water content only.

AGENCIES AND ORGANIZATIONS COOPERATING IN MONTANA SNOW SURVEYS

GOVERNMENT AGENCIES

- Canada**
- Water Survey of Canada, Calgary, Department of the Environment
 - Water Resources Service, Department of Lands, Forests and Water Resources, British Columbia
 - Alberta Environment, Edmonton, Alberta
- Federal**
- Department of the Army - Corp of Engineers
 - Department of Agriculture - Forest Service
 - Soil Conservation Service
 - NOAA
 - Department of Commerce
 - National Weather Service
 - Department of Interior
 - Bonneville Power Administration
 - Bureau of Indian Affairs
 - Bureau of Reclamation
 - Fish and Wildlife Service
 - Geological Survey
 - National Park Service

STATE AGENCIES

- Montana Conservation Districts
- Montana Department of Fish and Game
- Montana Department of Natural Resources and Conservation
- Montana State University - Agricultural Experiment Station
- University of Montana - School of Forestry
- DNR - State Forester

PRIVATE ORGANIZATIONS

- Montana Power Company
- Butte Water Company
- The Anaconda Company

Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.



RESERVOIR STORAGE (Thousand Acre Feet) END OF MONTH

Basin or Stream	RESERVOIR	Usable Capacity	Usable Storage		
			This Year	Last Year	Average
COLUMBIA RIVER DRAINAGE					
Kootenai	Kootenai	5,694.0	1,591.0	2,770.0	-
Flathead	Hungry Horse	3,428.0	1,641.0	2,326.0	2,329.0
	Flathead Lake	1,791.0	681.2	703.8	1,009.0
	Camas (4)	45.2	3.3	15.6	24.5
	Mission Valley (8)	100.3	38.3	46.7	34.9
Clark Fork	Georgetown Lake	31.0	23.9	28.1	25.3
	Lower Willow Creek	4.9	1.2	2.6	1.2
	Nevada Creek	12.6	-	5.5	5.7
	Noxon Rapids	334.6	261.8	290.0	300.6
Bitterroot	Painted Rocks	31.7	3.9	4.5	21.3
	Como	34.9	-	-	13.7

MISSOURI RIVER DRAINAGE

Beaverhead	Lima	84.0	-	47.5	31.9
	Clark Canyon	257.2	159.0	162.3	141.4
Ruby	Ruby	38.8	29.8	25.0	27.4
Madison	Hebgen Lake	337.5	243.2	232.7	202.0
	Ennis Lake	41.0	35.4	33.0	37.6
Gallatin	Middle Creek	8.0	3.8	3.6	3.6
Missouri	Canyon Ferry	2,043.0	1,490.0	1,727.0	1,608.0
	Hauser & Helena	61.9	52.2	61.3	57.4
	Lake Helena	10.4	10.9	10.2	9.0
	Holter Lake	81.9	80.9	79.5	51.2
	Fort Peck Lake	18,910.0	14,000.0	15,940.0	13,110.0
	Smith River	10.6	10.5	10.5	6.3
	Newlan Creek	12.4	3.9	0.0	-
	Bair	7.0	-	4.4	4.7
	Martinsdale	23.1	-	15.4	7.5
	Deadman's Basin	72.2	-	44.4	46.6
	Gibson	99.0	26.7	69.9	42.2
	Willow Creek	32.2	16.6	27.2	19.5
	Pishkun	32.0	18.9	16.4	17.4
Marías	Lower Two Medicine	11.9	-	-	-
	Four Horns	19.2	-	-	-
	Swift	30.0	9.7	19.3	17.9
	Lake Frances	111.9	28.1	78.2	78.3
	Elwell (Tiber)	1,347.0	518.8	495.0	576.8
	Beaver Creek	3.5	1.3	2.1	-
	Fresno	127.2	17.8	67.7	56.8
	Nelson	66.8	6.1	45.6	41.2

HUDSON BAY RIVER DRAINAGE

St. Mary's	Lake Sherburne	66.2	29.8	16.2	21.9
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YELLOWSTONE RIVER DRAINAGE

Stillwater	Mystic Lake	21.0	5.0	1.8	7.9
Clark's Fork	Cooney	27.4	13.1	14.6	14.7
Tongue	Tongue River	68.0	30.9	40.7	32.6
Big Horn	Big Horn Lake	1,356.0	820.8	870.0	800.8

Average based on 1958-72 period.



SOIL MOISTURE

DRAINAGE BASIN and STATION	Elevation	Profile (Inches)		Direct Survey	Soil Moisture (Inches)		
		Depth	Capacity		This Year	Last Year	Average

COLUMBIA RIVER DRAINAGE

Kootenai	Baree Trail	3800	48	7.5	2/28	6.5	4.7	6.1
	Murphy Lake R. S.	3000	48	22.6	3/1	19.7	19.4	20.1
	Raven	3050	48	23.0	3/1	17.5	14.6	18.2

Flathead	Oesert Mountain	5600	54	8.4	3/1	7.6	5.3	7.2
	Marías Pass	5250	54	6.5	2/26	6.1	4.2	5.3

Clark Fork	Black Pine	7100	48	10.0	3/1	7.6	6.5	7.4
	Lubrecht Forest	4100	48	26.8	3/2	15.7	14.0	16.1
	Seeley Lake R. S.	4030	48	11.9	3/6	9.9	4.8	8.0
	Skalkaho Summit	7260	48	10.8	3/3	9.4	8.4	9.6

Bitterroot	Gibbons Pass	7100	48	7.1	2/23	5.9	2.9	4.7
	Lolo Pass	5250	48	10.6	3/1	7.5	7.4	6.1

MISSOURI RIVER DRAINAGE

Beaverhead	Lakeview	6700	48	15.3	2/28	12.8	8.1	9.7
Madison	West Yellowstone	6700	48	6.5	2/26	2.6	1.3	2.3

Gallatin	Bridger Bowl	7250	48	17.0	2/28	14.8	15.6	15.9
	College Site No. 2	4856	54	17.7	2/27	13.0	8.6	13.9
	Lick Creek	6860	48	18.8	2/27	13.8	12.3	15.4
	Twenty-One Mile	7150	48	10.0	2/26	6.2	2.2	4.1

Missouri Main-Stem	Kings Hill	7420	48	11.8	2/22	8.3	4.4	6.7
	Stemple Pass	6350	48	5.9	2/27	4.2	3.6	4.1

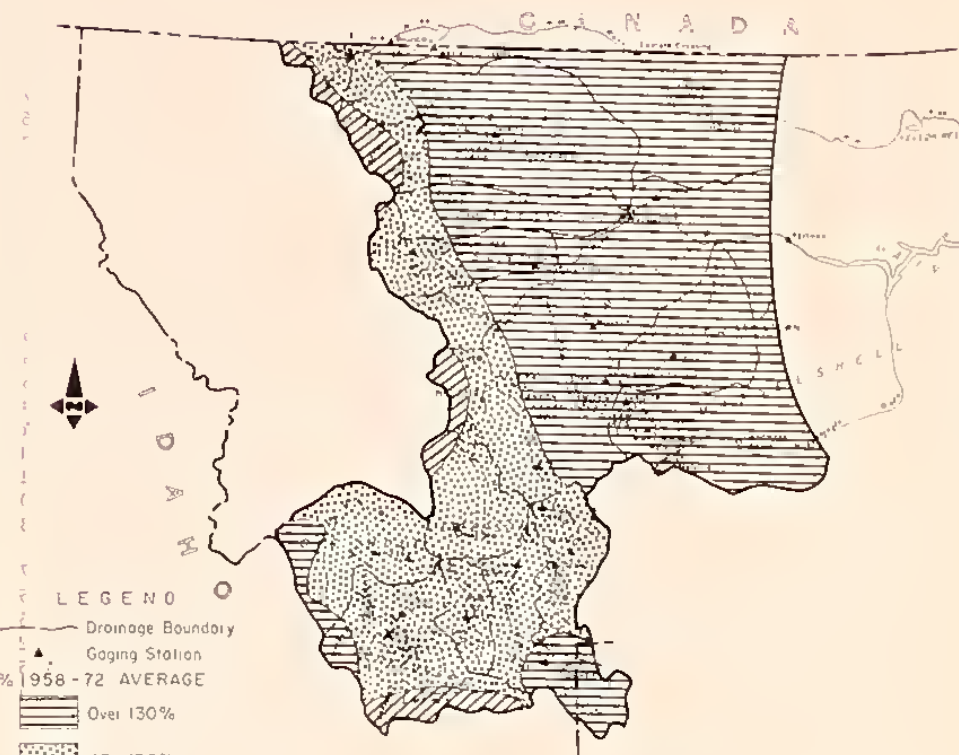
Milk	Beaver Creek	3950	48	20.9	2/28	8.1	9.3	9.8
	Rocky Boy	4700	36	10.1	2/23	7.9	7.0	7.1

YELLOWSTONE RIVER DRAINAGE

Shields	Battle Ridge	6020	48	17.6	2/28	15.2	9.6	13.2
	Upper Yellowstone	7350	48	9.4	3/2	7.9	4.3	5.7

Clark's Fork	Northeast Entrance	7350	48	9.4	3/2	7.9	4.3	5.7
	PMC Dryland	3700	48	20.7	3/6	5.7	5.8	-

Missouri River & Hudson Bay Drainages



MISSOURI RIVER & HUDSON BAY DRAINAGE MOUNTAIN SNOW WATER EQUIVALENT

SUMMARY OF SNOW MEASUREMENTS

RIVER BASIN and SUBWATERSHED	Number of Gaging Stations	THIS YEAR'S SNOW WATER AS PERCENT OF	
		Last Year	Average
Beaverhead	20	357	121
Ruby	9	310	120
Big Hole	14	342	125
Boulder	9	332	114
Jefferson	52	340	122
Madison	22	342	128
Gallatin	18	237	124
Missouri Headwaters	92	309	124
West-side Missouri (Toston-Cascade)	6	317	113
Smith & Belt	6	211	134
Missouri Main Stem	12	241	125
Teton & Sun	8	309	116
Marías	4	222	93
Marías-Teton-Sun	12	265	105
Judith	6	175	146
Musselshell	5	191	135
Judith-Musselshell	11	181	141
Milk	3	222	127
Bear Paws	2	166	176
Missouri Total	130	278	123

MOUNTAIN SNOWPACK

JEFFERSON - NEAR TO A LITTLE BELOW AVERAGE IN THE BEAVER-HEAD DRAINAGE. WELL ABOVE AVERAGE ALONG THE MONTANA-IDAHO BORDER IN THE BIGHOLE RIVER HEADWATERS. GENERALLY ABOVE AVERAGE IN OTHER TRIBUTARIES.

MADISON - WELL ABOVE AVERAGE IN ABOVE HEBGEN RESERVOIR AND ABOVE AVERAGE IN TRIBUTARIES BELOW HEBGEN. GALLATIN - VARIABLE, BUT GENERALLY ABOVE TO WELL ABOVE AVERAGE. MISSOURI MAIN STEM - WELL ABOVE AVERAGE EAST OF THE MISSOURI RIVER IN THE BELT AND SMITH RIVER DRAINAGES.

NEAR TO ABOVE AVERAGE ALONG THE CONTINENTAL DIVIDE. MARIAS-TETON-SUN - NEAR AVERAGE ALONG THE CONTINENTAL DIVIDE INCREASING TO ABOVE AVERAGE IN SOME OF THE LOWER ELEVATIONS.

JUDITH-MUSSELSHELL - WELL ABOVE AVERAGE IN MOUNTAINS AND IN LOWER ELEVATIONS. MILK - GENERALLY ABOVE AVERAGE SNOW WITH HEAVIEST AMOUNTS THE WATERSHED AREAS BELOW EASTERN CROSSING. VERY HEAVY IN THE BEAR PAW MOUNTAINS. ST. MARY'S - ABOUT AVERAGE SNOWPACK IN HIGHER ELEVATIONS WITH A LITTLE ABOVE AVERAGE IN LOWER ELEVATIONS.

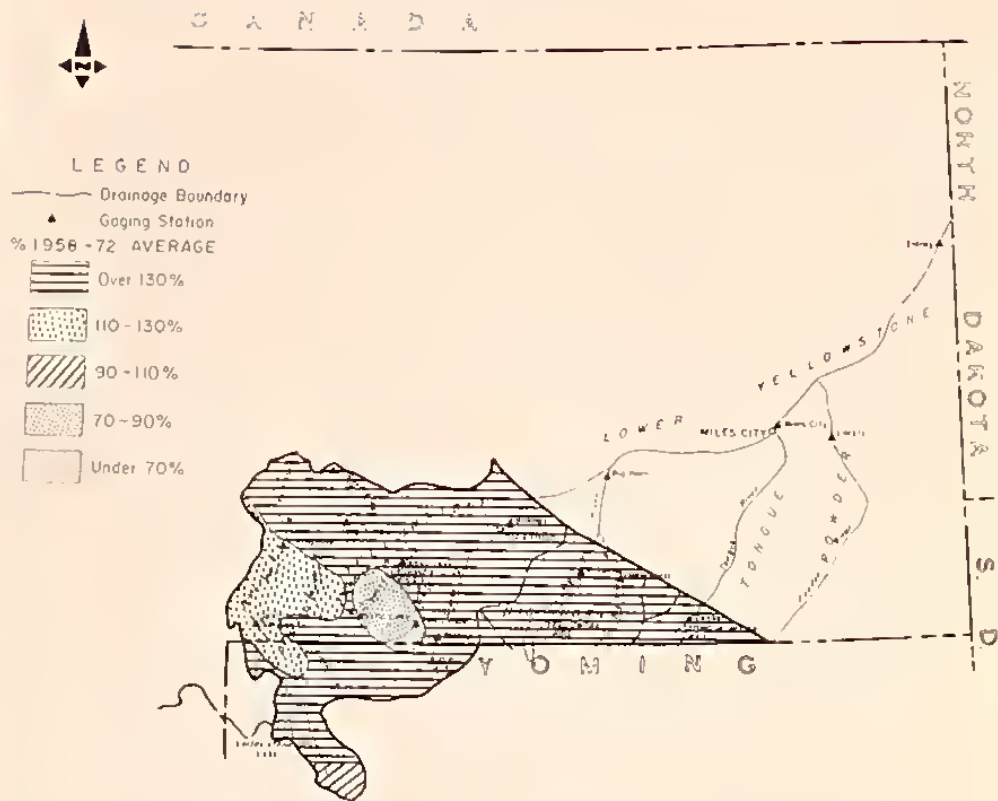
WATER SUPPLY OUTLOOK

Estimated by "Flow Line Manager," a
"railroad" with respect to Water Supply.

STREAM or AREA	Flow Period	
	Spring Season	Last Season
Beaverhead	Av	Av
Ruby	Ex	Av
Big Hole	Ex	Ex
Boulder	Ex	Av
Jefferson	Ex	Av
Madison	Ex	Ex
Gallatin	Ex	Ex
West-side Missouri	Ex	Av
Smith-Belt	Ex	Ex
Sun	Av	Av
Teton	Av	Av
Marias	Av	Av
Judith	Ex	Ex
Musselshell	Ex	Ex
Milk	Ex	Av
Bear Paws	Ex	Av
St. Mary's	Av	Av

Yellowstone River Drainage

STREAMFLOW FORECASTS



YELLOWSTONE RIVER DRAINAGE MONTANA MOUNTAIN SNOW WATER EQUIVALENT

SUMMARY of SNOW MEASUREMENTS (COMPARISON WITH PREVIOUS YEARS)

RIVER BASIN and/or SUB-WATERSHED	Number of Gaging Stations	THIS YEAR'S SNOW WATER AS PERCENT OF	
		Last Year	Average
Upper Yellowstone (ab. Livingston)	13	276	134
Shields	7	193	132
Boulder-Stillwater	2	222	115
Rock Creek-Clarks Fork	7	235	120
Yellowstone (ab. Big Horn River)	29	238	128
Big Horn/Wyoming	15	211	131
Little Big Horn	4	121	129
Big Horn (Total)	26	239	122
Tongue	6	119	112
Powder	4	127	106
Yellowstone (Total)	55	238	126

MOUNTAIN SNOWPACK



UPPER YELLOWSTONE - WELL ABOVE AVERAGE IN MOST AREAS, A LITTLE LESS IN SOME LOWER ELEVATIONS.

SHIELDS - WELL ABOVE AVERAGE.

BOULDER & STILLWATER - WELL ABOVE AVERAGE IN HEADWATERS, NEAR TO BELOW AVERAGE ON NORTHWESTERN FLANK OF BEARTOOTH MOUNTAINS IN STILLWATER DRAINAGE.

ROCK CREEK & CLARKS FORK - WELL ABOVE AVERAGE IN HEADWATERS

AREA, BELOW AVERAGE IN RED LODGE CREEK DRAINAGE.

BIG HORN - GENERALLY NEAR OR ABOVE AVERAGE IN WYOMING HEADWATERS.

LITTLE BIG HORN - SOMEWHAT VARIABLE, BUT GENERALLY ABOVE AVERAGE.

TONGUE - A LITTLE ABOVE AVERAGE IN BIG HORN MOUNTAINS, HEAVY SNOWPACK IN PRAIRIE AREAS.

POWDER - NEAR AVERAGE IN BIG HORN MOUNTAINS, HEAVY PRAIRIE SNOWPACK.

UPPER YELLOWSTONE - ABOUT 25 PERCENT ABOVE AVERAGE FOR ALL TRIBUTARIES ABOVE LIVINGSTON.

SHIELDS & SWEETGRASS - WELL ABOVE AVERAGE RUNOFF.

BOULDER & STILLWATER - WELL ABOVE AVERAGE IN BOULDER RIVER DRAINAGE AND HEADWATER TRIBUTARIES OF THE STILLWATER. ABOVE AVERAGE FOR STILLWATER RIVER, BELOW AVERAGE FOR LOWER STILLWATER AND ROSEBUD CREEK TRIBUTARIES.

ROCK CREEK & CLARKS FORK - ABOVE AVERAGE FLOW IN BOTH STREAMS. HOWEVER, BELOW AVERAGE RUNOFF IN RED LODGE

CREEK DRAINAGE AND OTHER TRIBUTARY STREAMS NEAR RED LODGE.

YELLOWSTONE RIVER - ABOUT 25 TO 30 PERCENT ABOVE AVERAGE RUNOFF FOR ALL STATIONS BELOW LIVINGSTON.

BIG HORN - ABOVE AVERAGE IN WYOMING INCREASING WITH SHOSHONE RIVER FLOW TO ABOUT 25 PERCENT ABOVE AVERAGE INTO YELLOWTAIL RESERVOIR.

LITTLE BIG HORN - RUNOFF SHOULD BE ABOVE AVERAGE.

TONGUE & POWDER - ABOVE AVERAGE WITH SIGNIFICANT RUNOFF FROM LOWER ELEVATIONS AND ABOUT AVERAGE FROM HIGHER ELEVATIONS.

BASIN, STREAM and/or FORECAST POINT	THIS YEAR		FORECAST PERIOD	PAST RECORD	
	Thousand Cubic Feet	Percent of Average		Thousand Cubic Feet	Average
YELLOWSTONE RIVER at Corwin Springs	2,490	125	Apr-Sept	1,129	1,996
YELLOWSTONE RIVER near Livingston	2,100	126	Apr-July	942	1,662
YELLOWSTONE RIVER at Billings	2,900	125	Apr-Sept		2,317
	2,420	126	Apr-July		1,926
BOULDER RIVER at Big Timber	500	132	Apr-Sept		379
	470	134	Apr-July		350
STILLWATER RIVER near Absarokee (1)	680	115	Apr-Sept		591
	570	115	Apr-July		494
CLARKS FORK RIVER near Belfry	780	129	Apr-Sept		607
	700	128	Apr-July		546
ROCK CREEK near Red Lodge	142	129	Apr-Sept	61.0	110
	108	129	Apr-July	45.0	84.0
INFLOW COONEY RESERVOIR near Boyd (2)	39.0	76	Apr-Sept		51.5
	31.0	75	Apr-July		41.1
YELLOWSTONE RIVER at Billings	5,400	127	Apr-Sept	2,178	4,246
	4,700	130	Apr-July	1,822	3,613
BIG HORN RIVER near St. Xavier (3)	2,300	124	Apr-Sept	618	1,849
	2,120	124	Apr-July	559	1,706
LITTLE BIG HORN RIVER near Lodgegrass (4)	168	115	Apr-Sept		146
	150	116	Apr-July		129
YELLOWSTONE RIVER at Miles City (5)	8,000	125	Apr-Sept		6,378
	7,100	128	Apr-July		5,555
YELLOWSTONE RIVER at Sidney (5)	8,550	128	Apr-Sept		6,665
	7,700	131	Apr-July		5,895

(1) Adjusted for storage in Mystic Lake.

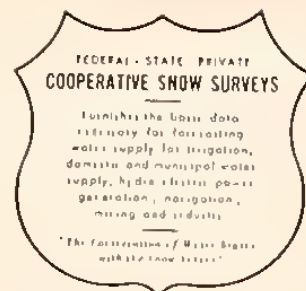
(2) Sum of Red Lodge Creek above reservoir and Willow Creek near Boyd.

(3) Adjusted for storage in Buffalo Bill, Boysen, Bull Lake and Big Horn.

(4) Sum Little Big Horn below Pass Creek and Lodgegrass Creek near Wyola.

(5) Adjusted for storage in Buffalo Bill, Boysen and Yellowtail Reservoirs.

Average based on 1958-72 period.



MANAGEMENT OF WATER SUPPLIES

by Phillip E. Farnes
Snow Survey Supervisor

The water supply is a limited resource. There is variation from year to year, but there is little opportunity to increase the total supply. As competition for this finite supply increases, the need for better management also increases. In many cases, there is enough water available, but it's distribution is such that it cannot all be used beneficially.

During the spring snowmelt there is generally too much water. Uses during this period are small. During the irrigation season streamflow is low and demands are high.

Some years, like the early 1970's have large amounts of runoff, others like 1977 are extremely low. The ability to predict these flows in advance is one step toward improved water management.

In our contacts with cooperators we see opportunities for improving irrigation water management and improving reservoir operation.

Better irrigation water management could increase yields, reduce drainage problems, and improve water quality. During last year's low water supply, many farmers and ranchers obtained good yields with less water than they have been

accustomed to using.

Reservoirs can be operated to provide more flood control, reduce maintenance costs on downstream structures, provide more water for irrigation, improve downstream water quality without any significant increase in operating costs while still providing a full water supply.

Basic data needs are also changing to meet new demands. Snow survey crews on snowshoes or skis are being assisted by automated sites and radio telemetry. SNOTEL (Snow Survey Telemetry) is being installed at 63 sites in Montana. Twice each day the water content of the snowpack, total precipitation, and air temperature will be transmitted using meteor burst communications.

This data will enable our unit to provide current information on the mountain snowpack. Forecasts can be updated more frequently. Manpower presently required to make manual snow surveys will be reduced as SNOTEL is implemented.

If you would like to discuss methods to improve the management of your water supply or have any questions relating to snow surveys or water supply forecasts, contact your local Conservation District Office.

WATER SUPPLY OUTLOOK

Expressed as "Poor, Fair, Average, Excellent" With Respect to Usual Supply

STREAM or AREA	Flow Period	
	Spring Season	Long Season
Yellowstone		
Yellowstone above Livingston	Ex	Ex
Shields	Ex	Ex
Boulder	Ex	Ex
Sweetgrass-Big Timber	Ex	Ex
Stillwater	Ex	Ex
Rock Creek	Ex	Ex
Clarks Fork	Ex	Ex
Yellowstone above Big Horn	Ex	Ex
Big Horn	Ex	Av
Little Big Horn	Ex	Av
Tongue	Ex	Av
Tongue	Ex	Av
Powder	Ex	Av
Lower Yellowstone	Ex	Ex

IRRIGATION WATER SUPPLIES

ABOVE AVERAGE LATE SEASON SUPPLIES, EXCEPT FOR AVERAGE OR BELOW FROM SMALL STREAMS DRAIN-

ING THE NORTHEAST FACE OF THE BEARTOOTH MOUNTAINS.

SOIL MOISTURE

GENERALLY BELOW AVERAGE IN ALL AREAS.

SOIL MOISTURE IS BASED ON MOISTURE LEVELS AT THE SOIL

MOISTURE STATIONS, FALL PRECIPITATION AND STREAMFLOW LEVELS DURING THE EARLY WINTER PERIOD.